

Find $\tan\theta$ if $\cos\theta = \frac{\sqrt{2}}{3}$ and $0^\circ < \theta < 90^\circ$

$$\cos\theta = \frac{\text{adj}}{\text{hyp}} = \frac{\sqrt{2}}{3}$$

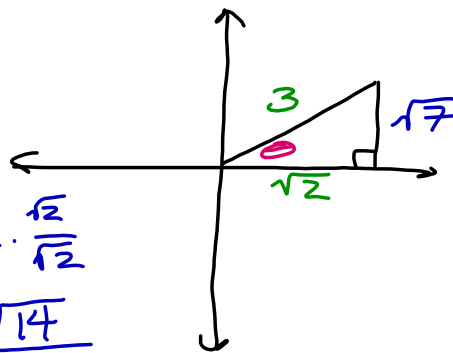
$$a^2 + b^2 = c^2$$

$$(\sqrt{2})^2 + b^2 = 3^2$$

$$b^2 = 7$$

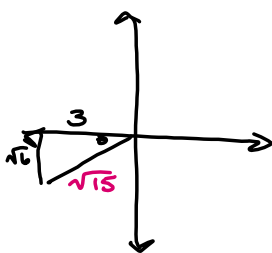
$$b = \sqrt{7}$$

$$\tan\theta = \frac{\sqrt{14}}{2}$$



Find $\sec\theta$ if $\cot\theta = \frac{\sqrt{6}}{2}$ and $180^\circ < \theta < 270^\circ$

$$\cot\theta = \frac{\sqrt{6}}{2} \quad \tan\theta = \frac{2}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{2}{\sqrt{6}}$$



$$\sqrt{60} = \sqrt{4 \cdot 15} = 2\sqrt{15}$$

$$(\sqrt{6})^2 + (2)^2 = c^2$$

$$6 + 4 = c^2$$

$$10 = c^2$$

$$\sqrt{10} = c$$

$$\sec\theta = \frac{\sqrt{10}}{2}$$

$$\tan\theta = \frac{\sqrt{6}}{3}$$

$$\tan^2\theta + 1 = \sec^2\theta$$

$$\left(\frac{\sqrt{6}}{3}\right)^2 + 1 = \sec^2\theta$$

$$\frac{2}{3} + 1 = \sec^2\theta$$

$$\pm \sqrt{\frac{5}{3}} = \sec\theta$$

$$\frac{\sqrt{5} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \sec\theta$$

$$-\frac{\sqrt{15}}{3} = \sec\theta$$

Find $\tan \theta$ if $\sec \theta = -2$ and $180^\circ < \theta < 270^\circ$.

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$\tan^2 \theta + 1 = (-2)^2$$

$$\tan^2 \theta + 1 = 4$$

$$\sqrt{\tan^2 \theta} = \sqrt{3}$$

$$\tan \theta = +\sqrt{3}$$

Find $\sin \theta$ if $\cos \theta = -\frac{1}{2}$ and $90^\circ < \theta < 180^\circ$.

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\sin^2 \theta + \left(-\frac{1}{2}\right)^2 = 1$$

$$\sin^2 \theta + \frac{1}{4} = 1$$

$$\sqrt{\sin^2 \theta} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$$

$$\sin \theta = +\frac{\sqrt{3}}{2}$$

